



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,062	12/11/2003	Akira Kuriyama	1232-5237	1255
27123	7590	11/04/2005	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			PERT, EVAN T	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 11/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/735,062

Applicant(s)

KURIYAMA ET AL.

Examiner

Evan Pert

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on the application filed December 11, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,2 and 15-22 is/are allowed.
- 6) ☒ Claim(s) 3-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The specification contains informalities, which should be corrected for better form (see 37 CFR 1.71):

At p. 2, line 9, "micro-pattern" should preferably read --a micro-pattern--.

At p. 2, line 23, "micrometer or nanometer" should preferably read --micrometers or nanometers--.

At p. 3, line 8, "geographic" should preferably be deleted.

At p. 5, line 11, "scaling" should preferably read --scaled--.

At p. 6, line 2, "expect" should preferably read --show--.

At p. 6, lines 11-12, "made various research efforts for" should preferably read --researched--.

At p. 13, lines 6-7, "an international distance" should preferably be deleted.

At p. 13, lines 14 and 21; p. 15, line 15; p. 16, line 15; and p. 18, line 17, "mm-square" should preferably read --mm-square--.

At p. 39, line 19, "film 105" should read --film 106--(as 105 is the upper electrode).

At p. 55, on lines 19 and 23, "silicon film" should read --silicon oxide film--.

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3-14 are device claims with “product-by-process limitations” [see MPEP 2113]. Applicant may claim a product by presenting process limitations, “so long as it is clear that the claim is directed to the product and not the process” [see MPEP 2173.05(p) Claim Directed to Product-By- Process or Product and Process] .

In the instant case, the “device” claimed includes limitations of elements that *have been* “removed.” For example, in claim 3, “p-n or p-i-n junctions” are “in” a “porous body,” clearly, yet the structure of the porous body is ambiguously defined by process limitations of removing “members” from a “structure”.

Any structure with pores could be said to “look like” it was formed by “removing cylinder shaped members from a structure” such as the admitted prior art for pores in aluminum by anodization, which is anticipation under the interpretation of product-by-process limitations [MPEP 2113].

The problem of claim scope ambiguity is compounded in claims 4, 9, 10 and 11 where the composition of (removed) "first material" is either claimed or compared to the composition of the "second material" yet the "first material" is not even part of the claimed product because the "first material" *was removed*.

The scope of the structure of claims 3-14 is unclear because process claim elements are drawn to a structure *in the past, as the product was in the making* rather than in the completed structural form of the claimed final product.

Since the process limitations of the product claimed are ambiguous, for purposes of examination, the "formed by" limitations and limitations of "removed" elements are not given significant patentable weight in device claims 3-14.

The "structure" of a "matrix member" capable of "forming a eutectic crystal" with "removed cylinder-shaped members" is ambiguous and/or indistinguishable from any "porous body having cylinder-shaped pores."

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 3, and 5-7 rejected under 35 U.S.C. 102(b) as being anticipated by DE 27 41 954 A1 [Derwent Abstract]. A request for translation to English of this '954 reference was placed internally at the USPTO at the time of this writing.

Regarding claim 3, in accordance with the comments under the rejection under 35 USC 112 above, the '954 reference discloses "p-n junctions" that are "in" [title] cylinder-shaped pores of a porous body [i.e. cylinder-shaped pores of porous aluminum oxide on an aluminum substrate, with the cylinder-shaped pores of anodized aluminum admitted as prior art cylinder-shaped pores per p. 3 of the specification].

Regarding claim 5, the silicon deposited in the pores disclosed in the '954 reference is semiconductor so the "eutectic crystal" limitation is met in that the "matrix member" of the "structure" of the '954 reference is a porous aluminum oxide film on aluminum. The Derwent abstract of the '954 reference discloses that the aluminum plate is the bottom electrode, and that an upper clear electrode is deposited, such that the electrodes will necessarily be "sandwiching" the semiconductor regions in the pores.

Regarding claim 6, the limitations of significance amount to a pair of electrodes sandwiching semiconductor p-n or p-l-n junctions in pores of a matrix member that can act as a seed for crystal growth of silicon in the pores. Claim 6 is significantly difficult to interpret due to lack of compliance with 35 USC 112 given the weight of process limitations. 2173.05(m).

Applicant should explain the structural elements that differ from prior art by claiming the directly observable, rather than by process limitations of "removing" things that are "compared" to other things present in the finally claimed structure.

Regarding claim 7, the devices in the pores are diodes and the end device with diodes in parallel is a solar cell.

Allowable Subject Matter

6. Claims 1-2 and 15-22 are allowed.
7. Claims 8 and 12-14 would be allowable if rewritten to overcome the rejection under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Boyes' "Understanding the p-n junction" is cited as a basic teaching of understanding that the "metal-metal diodes" in Brown, III (US 3,890,161) do not technically have "p-n junctions" as recited in applicant's claims.

Brown, III (US 3,890,161) is cited for disclosing a diode array in a porous body that was formed by mixing two kinds of materials and volatilizing one of the material⁵, yet teaches that "metal-metal" diodes are preferred, does not mention p-n junctions, and does not teach to form p-n junctions "in" i.e. (within) the pores since the pores are filled with a metal, flush with the porous body, that forms one side of the diode array.

US 2005/0032226 is cited because of "Example 12" at [0227] to [0234].

US 4,990,988 is cited for disclosing a diode array in a porous body, yet only the metal is in the pores.

US 2004/0144985 A1, US 5,81,091 and US 6,946,597 are cited for disclosing the formation of semiconductor devices in pores of a porous body.

Art Unit: 2826

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969.

The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP
October 28, 2005


EVAN PERT
PRIMARY EXAMINER